

PROGRESS REPORT ON
RIVER BASIN WATER QUALITY MANAGEMENT
PLANNING
(TACTICAL BASIN PLANNING)
DURING 2016

10 VSA 1253(d)

Testimony for
House Committee on Natural Resources, Fish, and Wildlife

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Watershed Management Division

January 12, 2017

Monitoring, Assessment and Planning Program (MAPP)

- Conduct and coordinate water quality testing statewide
- Relate results of testing to Water Quality Standards
- Create pollution control plans for individual lakes or streams (TMDLs)
- Develop Tactical Basin Plans to manage all waters of a watershed.
- Today's focus is on Basin Planning, and our annual report to the Committee.

PROGRAM HIGHLIGHTS

Monitoring, Assessment, and Planning Program

The Monitoring, Assessment, and Planning Program (MAPP) integrates three components of the Vermont water pollution control program. MAPP measures water quality indicators and evaluates these indicators in light of applicable standards or thresholds. Information about the condition of waters is then used to develop watershed plans that target waters for protection or remediation. MAPP also conducts water quality modeling, oversees water quality remediation planning for regulated entities, and maintains a comprehensive water quality database representing Vermont's surface waters.

A senior environmental technician collects biological specimens to document the high quality of this Green Mountain National Forest stream.

KEY INITIATIVES

Accomplished:

- Tested water at over 200 sites statewide and supported citizen scientists' water monitoring efforts
- Updated Water Quality Standards Rule
- Developed a robust tracking system for implementation projects and associated nutrient reductions
- Released Lamoille and Missisquoi Tactical Basin Plans

Upcoming:

- Issue Lake Memorandum of Understanding (MOU)
- Release South Lake Champlain watershed and Ottauquechee/Black River tactical basin plans

Number of stream, lake, and wetland locations tested for surface water pollution:

860

19 WATERSHED MANAGEMENT DIVISION | dec.vermont.gov/watershed

Introducing the Vermont Integrated Watershed Information System

Welcome to V-IWIS, Vermont's new Integrated Watershed Information System. V-IWIS was built to provide users access to all sorts of water chemistry, quality, and biomonitoring data from the Watershed Management Division's data archives, and the online reporting webtools of partner organizations.

To access data using V-IWIS, go to <https://anrweb.vt.gov/DEC/VWIS/>. From there you can search by site name or water quality test, or browse locations using the Agency of Natural Resources (ANR) Atlas. As users explore, they will discover the capability to obtain overall monitoring site summaries and detailed individual data that come from within the Division's archives.

Specifically, users can obtain:

- Site lists derived using robust search tools
- Site locations using Google Maps and the ANR Atlas
- Overall monitoring site summaries of biological, chemical, and physical information
- Macroinvertebrate monitoring site summaries
- Water quality summaries, and access to detailed, searchable data

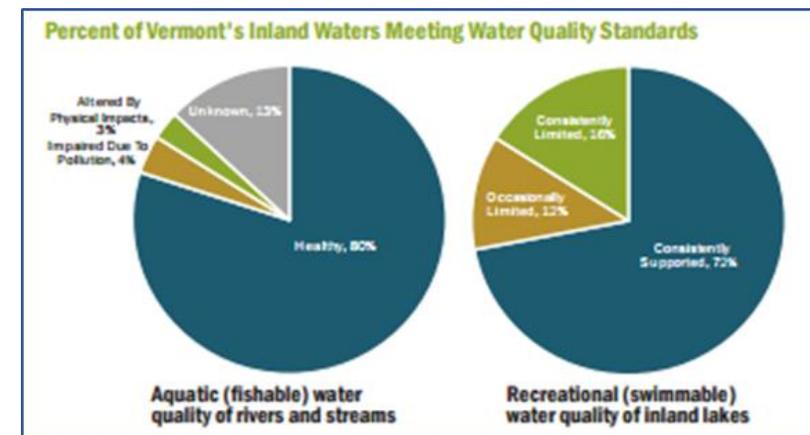
When accessing these reports, please look for "More Info" buttons, which provide incrementally more detailed data, and "For More Details" links to fact sheets describing the data being displayed.

The Monitoring, Assessment, and Planning Program's data analysis staff are developing additional search tools and augmented reporting capabilities, including multi-site summaries.

For more information on the Monitoring, Assessment, and Planning Program, visit dec.vermont.gov/watershed/rap.

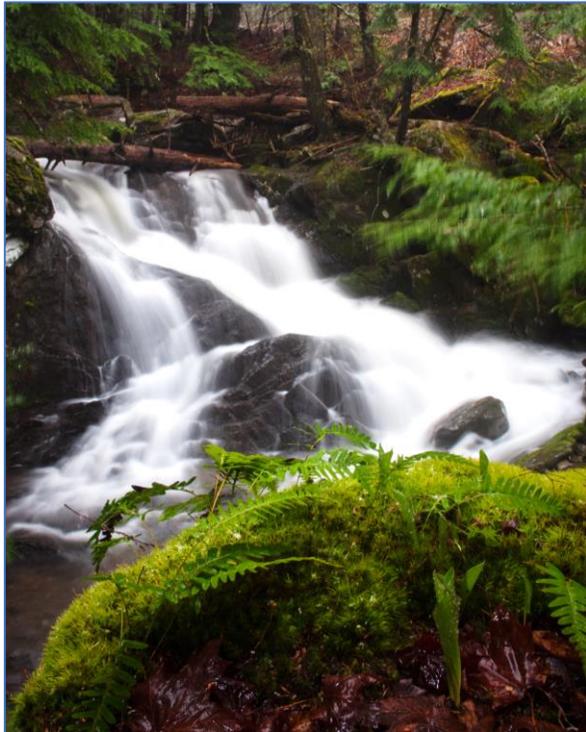
Macroinvertebrates such as the stonefly larva pictured above are important indicators of a stream's biological health. Macroinvertebrate site summaries produced by V-IWIS make monitoring and assessment results easily accessible.

2016 Annual Report | WATERSHED MANAGEMENT DIVISION 20



Tactical Basin Planning is a Process

- **Protect the Best**



- **Restore the Rest**



Statutory requirements for basin planning:

10 VSA 1253

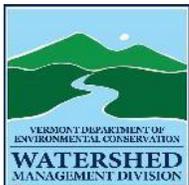
40 C.F.R. 130.6





Tactical Basin Planning

- 15 Planning Basins
- 5 Planners
- 5-year cycle
- 3 Phases:
 - Monitoring & assessment
 - Planning
 - Implementation

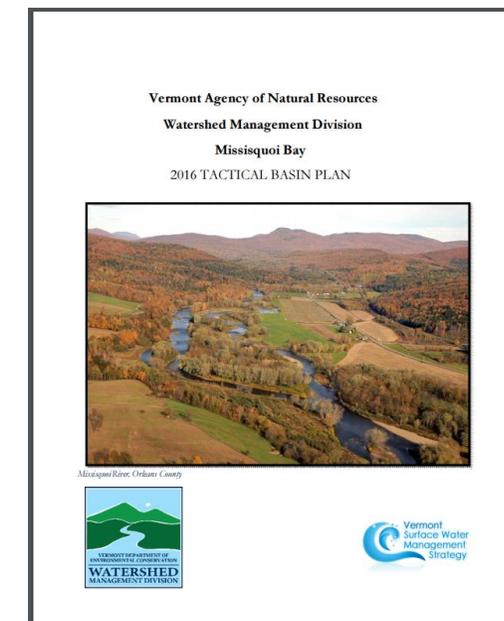
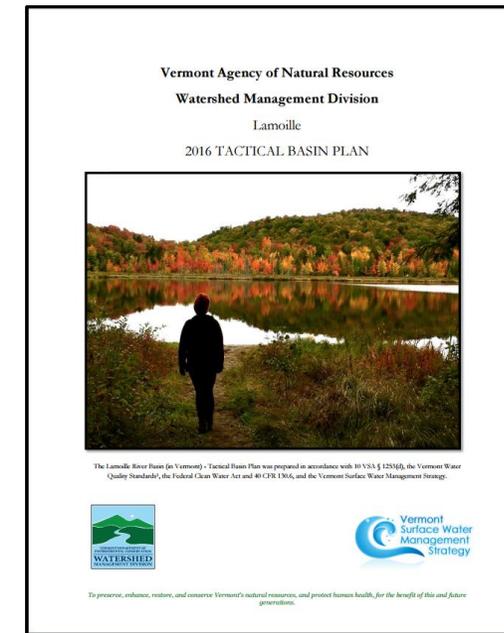


*Tactical Basin Planning:
Vermont Department of
Environmental Conservation*



Steps to Tactical Basin Planning

- Gather water quality information
- Compile and analyze other inventories and plans
- Consult water quality models
- Develop actions and projects
- Prioritize
- Identify partners and funding
- Implement projects
- Continually update project status
- Repeat

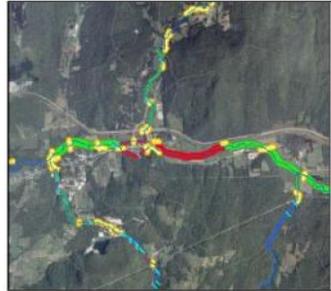


Tactical Basin Plans Integrate Information:

Water Quality Monitoring

Macroinvertebrate Site Summary											
Location:	Rice Brook					Location ID:	502095				
Town:	Warren					Site ID:	494042090004				
Description:	Located below WWTF, and Access Road about 100m.					WBID:	VT08-20				
Date	Sample Method	Density	Richness	EPT Richness	PMA O	BI	Oligo.	EPT / EPT + C	PPC5 F	Community Assessment	
10/14/1986	KN	46	16.5	10.5	60.5	1.45	6.34	0.52	21.6		
8/29/1989	KN	68	18.0	9.0	75.3	3.41	0.00	0.63	47.7		
9/28/1990	KN	40	16.0	9.0	70.0	2.29	6.00	0.91	47.5	Poor	
9/27/1991	KN	47	13.0	9.0	68.8	1.16	4.26	0.96	30.4	Poor	
9/18/1992	KN	307	19.0	11.0	65.9	2.14	3.74	0.92	43.7	Poor	
9/10/1993	KN	72	13.0	5.0	68.4	2.90	31.94	0.68	41.8	Poor	
9/8/1994	KN	98	17.0	11.0	60.8	2.56	11.22	0.57	37.9	Poor	
9/7/1995	KN	141	16.0	10.0	72.0	2.10	4.97	0.81	47.3	Poor	
9/11/1996	KN	116	22.0	11.0	71.1	1.55	0.96	0.81	41.1	Poor	
9/8/1997	KN	120	23.0	12.0	63.8	1.45	14.19	0.87	51.4	F-Poor	
10/18/1998	KN	62	18.0	9.0	66.4	3.15	3.66	0.58	33.7		
10/17/1999	KN	177	25.7	14.7	67.1	2.04	3.44	0.66	51.3	Fair	
9/10/2000	KN	327	22.0	11.0	60.1	0.93	0.00	0.87	41.6	Fair	
9/3/2001	KN	269	27.0	17.0	73.7	2.22	1.12	0.68	56.2	Fair	
9/2/2002	KN	225	13.0	11.0	61.6	0.48	0.00	0.80	36.2	Fair	
9/2/2002	KN	198	20.0	11.0	61.6	2.18	1.05	0.62	57.4	Fair	
9/7/2003	KN	465	27.0	12.0	65.3	1.72	0.65	0.74	44.4	Fair	
9/3/2004	KN	522	35.0	18.0	61.6	1.55	9.00	0.84	48.3	Good	
8/12/2005	KN	350	34.5	17.5	66.1	2.76	4.08	0.60	61.3	Good	
9/5/2006	KN	326	29.0	16.0	68.0	2.87	2.97	0.62	43.5	Fair	
9/4/2007	KN	374	36.0	17.0	73.1	1.87	2.14	0.77	62.0	Good	
9/5/2008	KN	253	36.0	18.0	77.1	3.20	12.25	0.72	48.9	G-Fair	
9/5/2008	KN	297	31.0	19.0	70.0	2.15	6.39	0.92	42.9	G-Fair	
9/20/2009	KN	277	40.0	22.0	73.7	2.69	9.75	0.70	55.6	G-Fair	
9/20/2009	KN	356	30.0	20.0	69.4	1.80	0.51	0.84	43.6	Good	
8/27/2011	KN	365	34.0	19.0	75.1	3.09	9.32	0.66	50.1	Good	

Stream Geomorphic Condition



Existing

Town Zoning and Corridor Protection

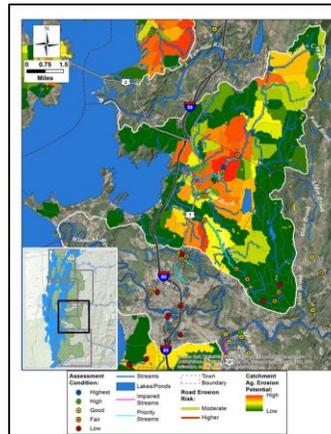


Stormwater Master Plans

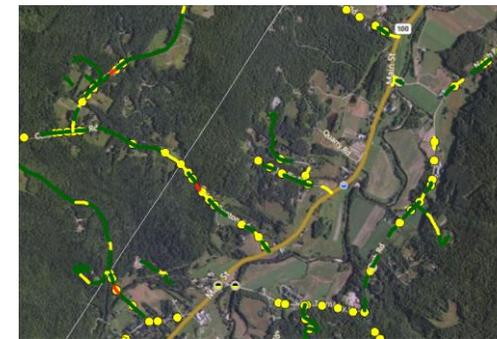


Figure 4. Subwatershed draining to a culvert at the southeast corner of the Fourniers Door and Winslow business at the corner of Rt. 78 and Brooklyn St.

Agricultural Assessments

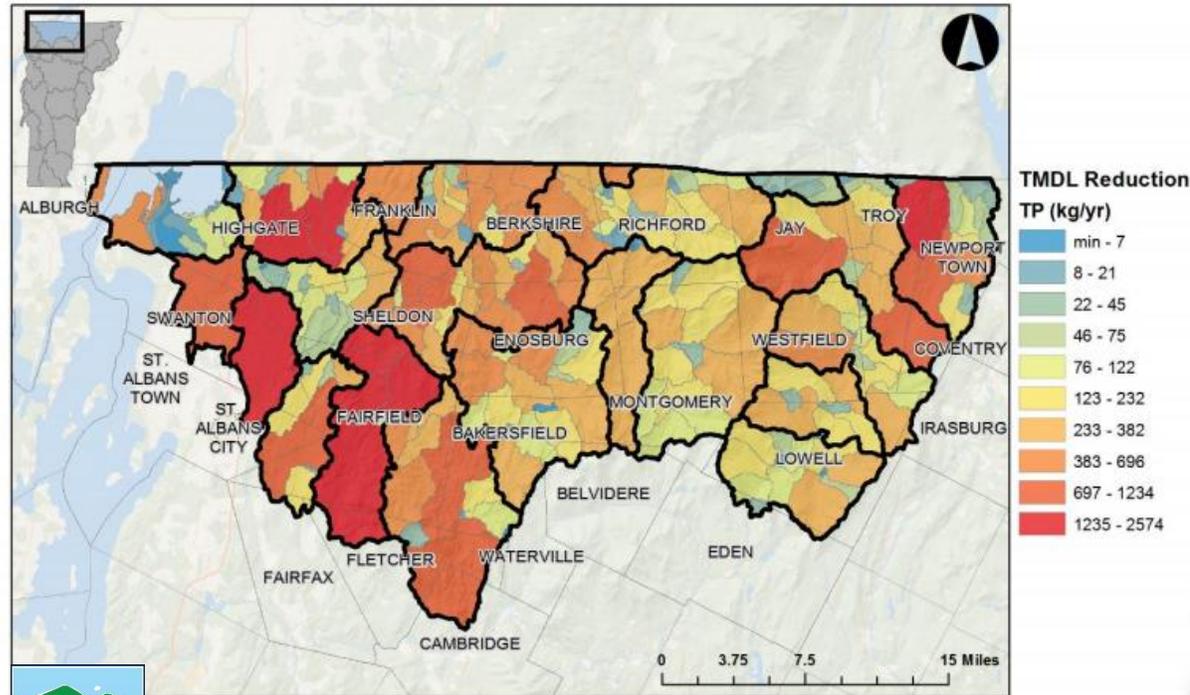


Road Inventory and Erosion Risk

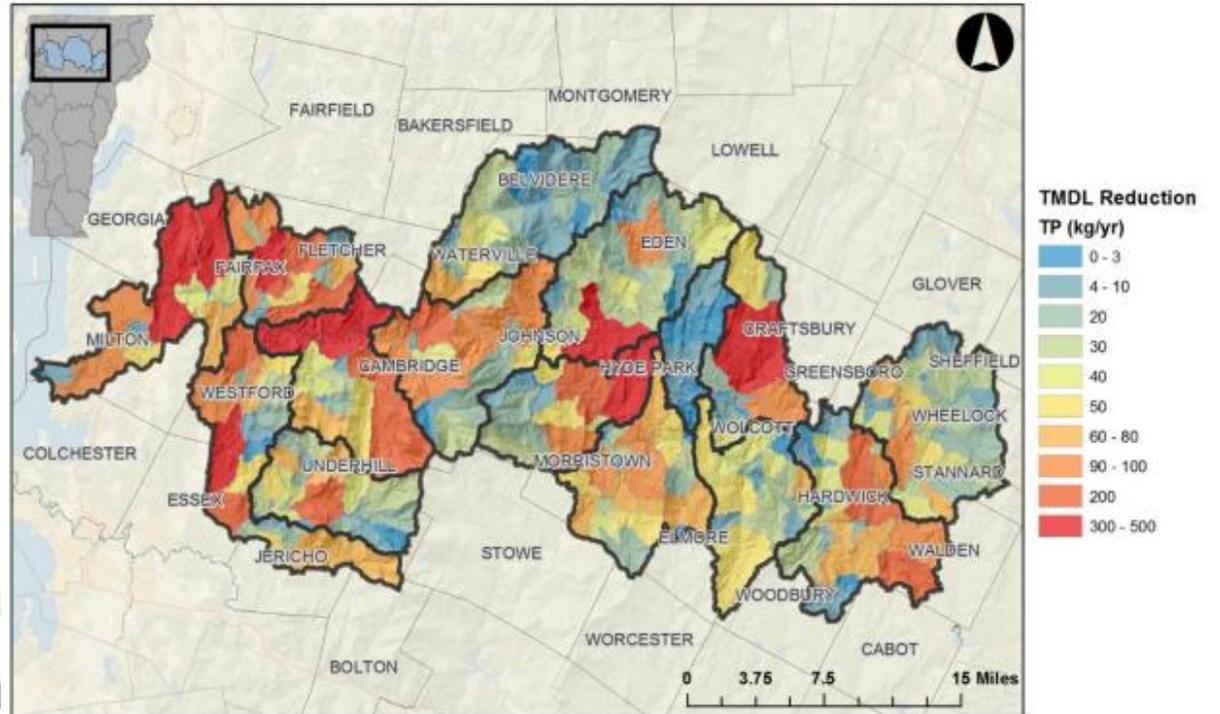


Tactical basin plans also project phosphorus reductions for the Lake Champlain TMDL

Total TMDL Reduction Potential Missisquoi Bay

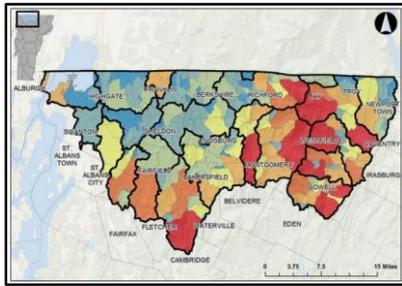


Total TMDL Reduction Potential Malletts Bay

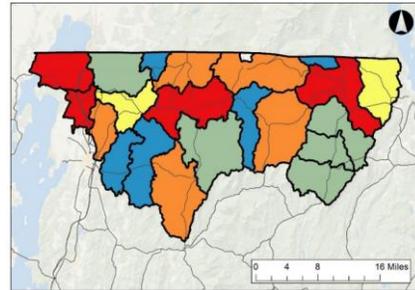


We use the modeling to assist implementation of regulatory programs that control nutrient pollution

Forests



State roads/facilities



“MS4” communities

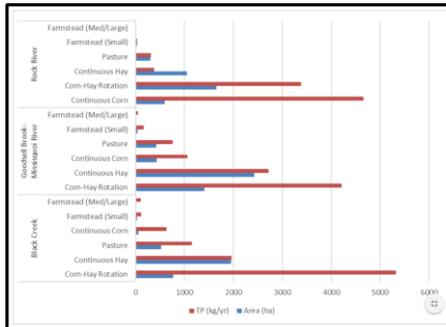
represents portions of the municipality that drain to the Lamont stream.

MS4 Municipality	Paved road (excluding Vtrans managed roads) (kg/yr)	Unpaved roads (kg/yr)	Other developed lands (kg/yr)
Essex	30	37	260
Milton	181	18	373

Three-acre parcels

Town	Parcels (#)	Impervious (acres)
Eden	1	0.1
Highgate	8	75.5
Jay	4	74.0
Lowell	2	22.0
Montgomery	2	15.8
Richford	4	25.6
Swanton	8	38.1
Troy	1	3.6
Total	30	254.7

Agriculture

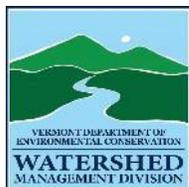


Local roads

Town	Paved Roads (kg/yr)	Unpaved Roads (kg/yr)	Town	Paved Roads (kg/yr)	Unpaved Roads (kg/yr)
Bakersfield	332.5	263.4	Jay	249.5	70.1
Belvidere	---	---	Lowell	316.6	67.4
Berkshire	291.5	144.4	Montgomery	302.7	119.3
Cambridge	108.4	53.3	Newport	256.2	104.4
Eden	4.7	---	Richford	280.3	81.0
Enosburgh	357.8	177.4	Sheldon	240.9	56.7
Fairfax	0.1	---	St. Albans	87.1	43.5
Fairfield	398.4	232.5	Swanton	398.6	27.0
Fletcher	11.0	10.6	Troy	210.2	58.1
Franklin	247.8	59.4	Westfield	196.7	43.9
Highgate	402.9	66.4			
Total loading from all roads (kg/yr)	6374				
Total reduction based on overall	2180				

Wastewater treatment facilities

Facility (permit ID)	Permit expiration date	Planned permit re-issuance year	Design flow MGD	IMC ² 7010 /LMM	Current permitted load (mt P/yr)	TMDL WLA (mt P/yr)	2010 flow (MGD) / Percent of Design flow	Treatment type	# of CSOs	Receiving water
Fairfax (D-1194)	9/30/10	2017-18	0.078	0.001/4 0.001	0.539	0.539	0.033 / 42%	Aerated lagoon	0	Lamoille River
Jeffersonville (D-1323)	3/31/10	2017-18	0.077	0.001/4 0.001	0.532	0.532	0.036 / 47%	Aerated lagoon	0	Lamoille River
Johnson (D-1149)	3/31/09	2017-18	0.270	0.029/0 .012	0.224	0.224	0.120 / 44%	Sequential batch reactor	0	Gihon River
Morrisville (D-1155)	12/31/13	2017-18	0.550	0.018/0 .007	0.352	0.352	0.221 / 40%	Sequential batch reactor	0	Lamoille River
Milton (D-1203)	12/31/10	2017-18	1.000	0.010/0 .004	0.829	0.829	0.245 / 25%	Sequential batch reactor	0	Lamoille River
Hardwick (D-1143)	12/31/09	2017-18	0.371	0.023/0 .009	0.410	0.410	0.220 / 50%	Aerated lagoon	0	Lamoille River
PBM Nutrientals (D-1209)	6/30/12	2017-18	0.425	NA	0.352	0.352	0.125 / 29%	Activated sludge upgrade to Monable Bed Bio Reactor	0	Lamoille River



Tactical basin plans present continually-refreshing lists of actions and projects

WDP Home Help

Projects

Name Status Grant Number

Project Type County Project ID

Basin Plan Town

Grade Type Grade

		ID	Project Name	Project Type	Status	Grant Number(s)
Edit	View	161	Regional Hydroseeder Program	Stormwater Equipment - Roads	Implementation Funded	2017-CWF-2-02
Edit	View	26	Rankin Farm River Corridor Easement	River Corridor Easement	Implementation Funded	2016-ERP-3-01
Edit	View	140	Winooski Trees for Streams/Riparian Buffer Restoration, 2016	Riparian Planting - River	Implementation Funded	2016-ERP-2-15
Edit	View	127	Jericho Stormwater Master Plan	Stormwater Master Planning	Scoping Funded	2016-CWF-1-04
Edit	View	93	Hardwick Stormwater Master Plan	Stormwater Master Planning	Scoping Funded	2016-CWF-1-03
Edit	View	60	Selawsky River Corridor Easement: Wild Branch - Phase 2	River Corridor Easement	Implementation Completed	2015-ERP-3-08
Edit	View	61	Jeffersonville Easement Acquisition	River Corridor Easement	Implementation Funded	2015-ERP-3-07
Edit	View	59	Selawsky River Corridor Easement: Wild Branch	River Corridor Easement	Scoping Completed	2015-ERP-3-06
Edit	View	52	Hurteau River Corridor Easement, Lamoille River	River Corridor Easement	Implementation Completed	2015-ERP-3-03
Edit	View	58	Hyde Park Stormwater Improvement Project	Stormwater	Implementation Funded	2015-ERP-2-20
Edit	View	87	Implementation of Road Erosion BMPs along Class IV Roads	Road Project	Implementation Completed	2015-ERP-2-17
Edit	View	68	Equine Manure Runoff Management Program	Agricultural Pollution Prevention	Implementation Completed	2015-ERP-2-10
Edit	View	57	Cambridge Trail Bridge Replacement and Floodplain Restoration	Floodplain/Stream Restoration	Implementation Funded	2015-ERP-2-01
Edit	View	235	Brewster River Stream Geomorphic Assessment and Corridor Planning	River Corridor Planning	Scoping Completed	2014-ERP-2-22
Edit	View	238	Statewide Trees for Streams/Riparian Buffer Restoration, 2014-2015	Riparian Planting - River	Implementation Completed	2014-ERP-2-01
Edit	View	274	Jeffersonville Riparian Corridor Easement	River Corridor Easement	Implementation Completed	2013-ERP-3-04.1
Edit	View	92	Georgia Deer Brook Gully Stormwater Project	Stormwater	Scoping Graded	
Edit	View	94	Upper Lamoille Bridge and Culvert Upgrades	Road Project	Discovery	
Edit	View	96	Scribner Bridge over Gihon River	Road Project	Scoping Completed	
Edit	View	98	Bryan Pond Dam Removal	Dam/Structure Removal	Scoping Completed	
Edit	View	110	Hardwick Road Erosion Inventory	Road Erosion Control Inventory	Scoping Graded	
Edit	View	111	Stannard Road Erosion Inventory	Road Erosion Control Inventory	Discovery	
Edit	View	112	Walden Road Erosion Inventory	Road Erosion Control Inventory	Scoping Graded	

- All projects that have a potential water quality benefit are entered into an online database
- Projects are prioritized with partner input (RPCs, Cons. Districts).
- Database summaries are publicly available.

Tactical basin plans identify key partners and funding, when known

WDP Home Help

Project ID 92 [Exit](#)

Project Name Georgia Deer Brook Gully Stormwater Project

Grant Number(s)

Project [Events](#) [Measures](#) [Grading](#) [Related Projects](#)

Project View

Project Name Georgia Deer Brook Gully Stormwater Project

Description
A series of connected underground storm drains and catch basins in the vicinity of the intersection of Route 7 and 104a in Georgia outfalls in to an area of erodible soils forming a gully that discharges sediment into Deer Brook. A project has been designed to stabilize the gully to mitigate severe erosion caused by stormwater runoff with a rock lined outfall. Eroding AOT culverts should also be replaced.

Project Type Stormwater

SGA Reach Deer Brook mouth to 2.5 miles upstream

Latitude 44.69574 **Longitude** -73.10653

Notes
Old plans need to be reviewed and redesigned to account for any changes. The designs should be reviewed by the Rivers Program. Source: Deer Brook Gully Remediation and Stormwater Treatment Georgia, Vermont, Summary Report, February 2007.

Link [Link](#)

[Exit](#)

Towns & Regions

Town
Georgia

Basin/Sub Basins

Sub Basin
Tributaries to Lower Mid Lamoille
Lamoille River Basin

Partners

Partner	Status
Vermont Agency of Transportation	Active
Friends of Northern Lake Champlain	Active
Vermont Department of Environmental Conservation	Active

Potential Funding Sources

Funding Source
Ecosystem Restoration Program
Clean Water Fund



The Role of the Community



- ✓ Identify water quality issues – what did we miss?
- ✓ Assist in targeting strategies
- ✓ Formulate a collaborative approach
- ✓ Be Involved in implementation.

MAPP has evolved the planning program to deliver fully-integrated and online basin plans.

Online Basin Plan Documents



Hudson River Drainage Basin:

[Battenkill, Hoosic, Walloonsac](#)

Lake Champlain Drainage Basin:

[Southern Lake Champlain *](#)

[Otter, Little Otter, Lewis Creeks](#)

[Northern Lake Champlain](#)

[Missisquoi Bay †](#)

[Lamoille](#)

[Winooski](#)

Connecticut River Drainage Basin:

[White](#)

[Ottauquechee, Black ‡](#)

[West, Williams, Saxtons †](#)

[Deerfield ‡](#)

[Stevens, Wells, Waits, Ompompanoosuc §](#)

[Passumpsic](#)

[Upper Connecticut River](#)

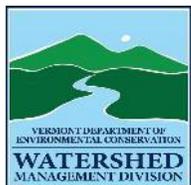
Lake Memphremagog Drainage Basin:

[Lake Memphremagog, Coaticook, Tomfobia](#)



Online Implementation Tables

	ID	Project Name	Project Type	Status	Grant Number(s)
Edit	View	94 Upper Lamoille Bridge and Culvert Upgrades	Road Project	Discovery	
Edit	View	98 Bryan Pond Dam Removal	Dam Removal	Discovery	
Edit	View	111 Stannard Road Erosion Inventory	Road Erosion Control Inventory	Discovery	
Edit	View	113 Wheelock Road Erosion Inventory	Road Erosion Control Inventory	Discovery	
Edit	View	116 Westford Road Erosion Inventory	Road Erosion Control Inventory	Discovery	
Edit	View	118 Milton Road Erosion Inventory	Road Erosion Control Inventory	Discovery	
Edit	View	119 Georgia Road Erosion Inventory	Road Erosion Control Inventory	Discovery	
Edit	View	120 Fletcher Road Erosion Inventory	Road Erosion Control Inventory	Discovery	
Edit	View	121 Fairfax Road Erosion Inventory	Road Erosion Control Inventory	Discovery	
Edit	View	125 Woodbury Road Erosion Inventory	Road Erosion Control Inventory	Discovery	
Edit	View	159 Elmore Garage Stormwater Project	Stormwater	Discovery	
Edit	View	162 Seymour River Watershed Stream Geomorphic Assessment and River Corridor Plan	Corridor Planning	Discovery	
Edit	View	290 Mapping and baseline data (in lieu of a full Phase 2) for the tributaries to the Upper Lamoille	Corridor Planning	Discovery	
Edit	View	291 Proofing Culvert Inventory for Upper Lamoille	Road Project	Discovery	
Edit	View	292 Watershed Education Projects	Education & Outreach	Discovery	
Edit	View	295 Lamoille River Paddlers' Trail Support	Public Engagement	Discovery	
Edit	View	296 Flood Resiliency Workshop and Related Projects	Education & Outreach	Discovery	
Edit	View	297 Lamoille County Planning Commission Water Quality Database Updates	Technical Assistance	Discovery	
Edit	View	302 Rodman Brook Remediation Project	Floodplain/Stream Restoration	Discovery	
Edit	View	303 Lowell asbestos mine- Hutchins Brook,	Floodplain/Stream Restoration	Discovery	
Edit	View	304 Johnson State College Monitoring Project	Water Quality Sampling	Discovery	
Edit	View	305 Garage Seep in Waterville Village	Floodplain/Stream Restoration	Discovery	
Edit	View	314 Mapping and baseline data (in lieu of a full Phase 2) for the tributaries to the Upper Lamoille	Corridor Planning	Discovery	
Edit	View	315 Cabot Road Culvert Replacement, Walden	Road Project	Discovery	
Edit	View	323 Berm Mapping for Cemetery Brook	Floodplain/Stream Restoration	Discovery	
Edit	View	324 Culvert Replacement Project, Lakeshore Road Greensboro	Road Project	Discovery	
Edit	View	325 Restoration Project Bachelor Brook, Greensboro	Road Project	Discovery	
Edit	View	326 Buffer Plantings on Tate Brook, Greensboro	Riparian Planting - River	Discovery	
Edit	View	327 Upstream Buffer Planting, Tate Brook, Greensboro	Riparian Planting - River	Discovery	
Edit	View	328 The North Shore Road culvert replacement, Greensboro	Road Project	Discovery	
Edit	View	329 Dry Culvert stabilization, Greensboro	Road Project	Discovery	
Edit	View	330 Porter Brook Buffer Planting, Caspian Lake Tributary in Greensboro	Riparian Planting - River	Discovery	



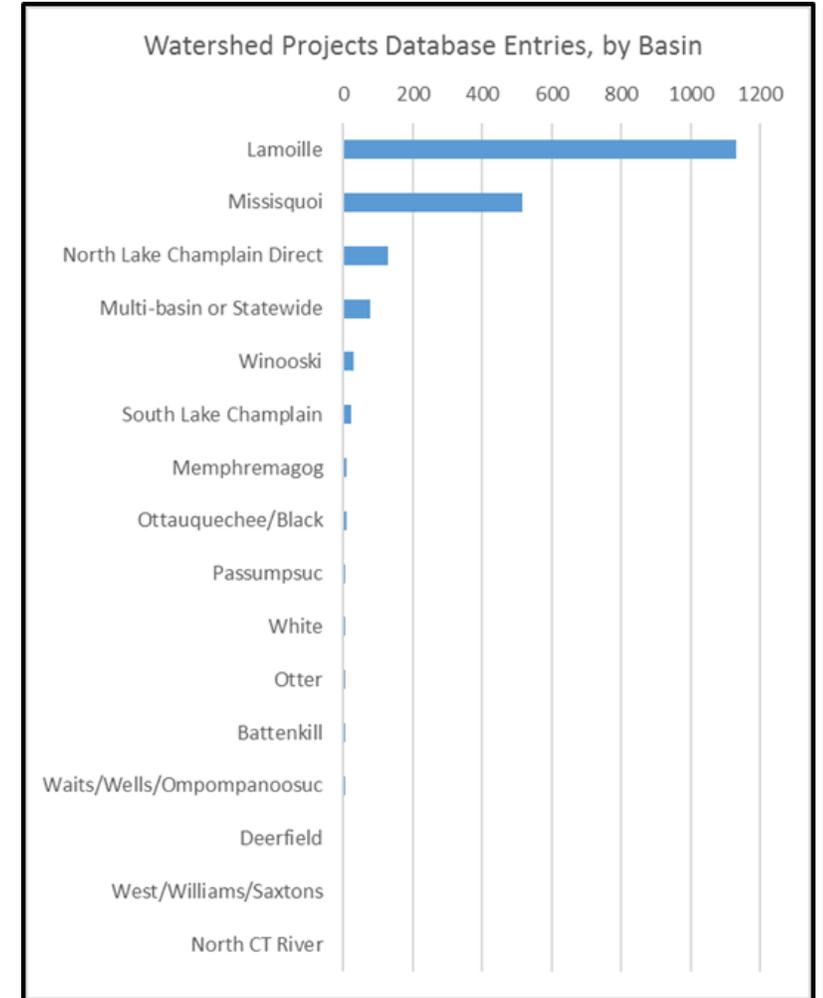
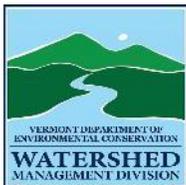
- [Battenkill, Hoosic, Walloomsac Tactical Basin Plan](#). Approved January, 2016
- [Lamoille Basin Tactical Plan and Phase II Lake Champlain TMDL Implementation Plan](#). Approved December, 2016
- [Missisquoi Bay Basin Tactical Plan and Phase II Lake Champlain TMDL Implementation Plan](#). Approved December, 2016
- [West, Williams, Saxton's Tactical Basin Plan](#). Approved January, 2016.
- The Lake Memphremagog Phosphorus TMDL and Lake Memphremagog and Coaticook Basin Tactical Basin Plan. *Forthcoming*



Annual Report Highlights

Business Process Improvement

- Standardized the tactical planning process
- Constructed a new database system for project *and* progress tracking;
- Developed planned project lifecycle stages;
- Aligned grant process with project priorities.



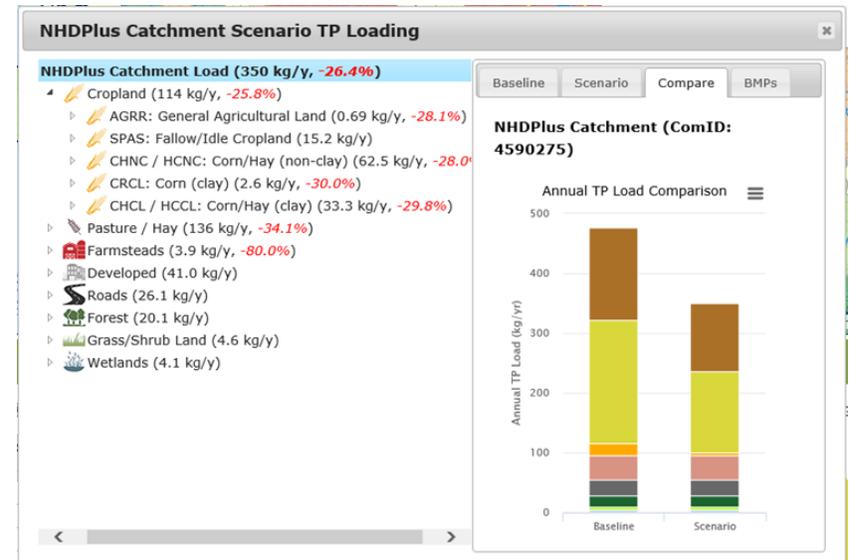
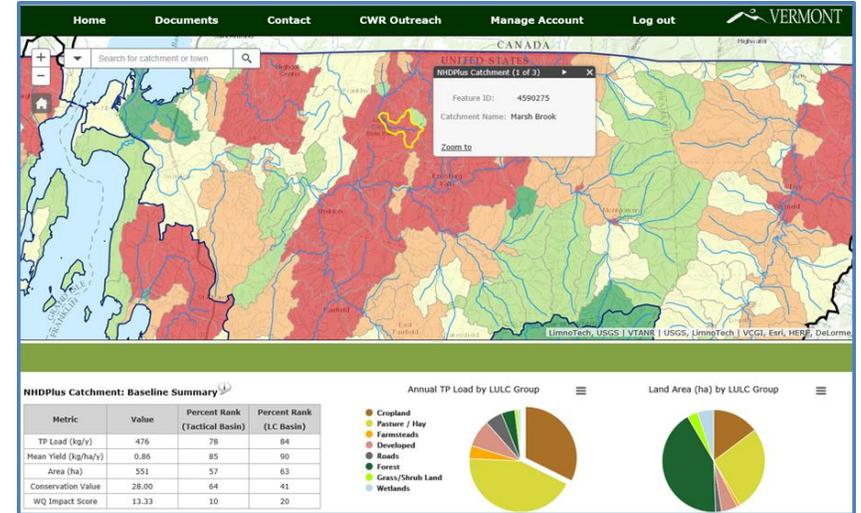
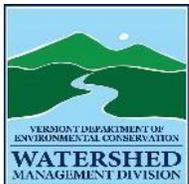
- Integrate municipal priorities into tactical plans.
- Municipal outreach for Act 64.
- Integrate tactical basin planning with RPC-led planning activities, such as transportation and hazard mitigation planning.
- Outreach to municipalities to support higher levels of protection.
- Water Quality Advisory Committees for municipalities.
- In some instances, RPC partner with Conservation Districts to augment support.



Annual Report Highlights

Clean Water Roadmap

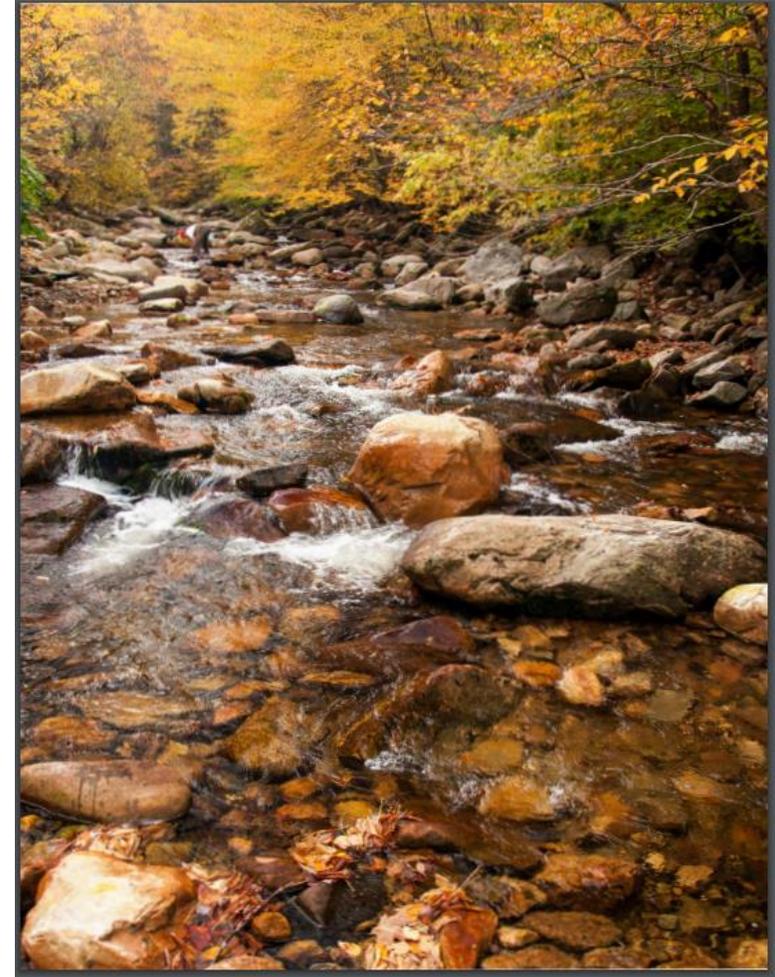
- Online phosphorus planning/mapping program - coming in March, 2017
- Funded by Keurig GMCR with support from TNC, DEC, and others
- Presents online maps of phosphorus pollution and appropriate reduction practices.
- Can be used to map phosphorus reduction projects from DEC's database for public.



Annual Report Highlights

Very High Quality Waters Protection

- Act 79 (2016) directed DEC to revise Vermont Water Quality Standards Rule to improve protection of surface waters.
- Rule amendment completed during 2016.
- Dozens of miles of new Class A(1) stream designated in Green Mountain National Forest lands.
- New temperature standards to protect fisheries.
- Four new Class 1 Wetlands in front of LCAR this morning.



Annual Report Highlights

Other useful content

- Three-year schedule for basin plan development
- Three-year strategic outline of actions established by tactical basin plans
- MAPP's planners – contact information
- Highlights from all 15 of Vermont's basins.



FEMA supported buyout and removal of Irene-damaged homes to restore natural floodplains

For additional information



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